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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/522,328	01/25/2005	Gopi Kumar Bulusu	DAD-0012	9213

23353 7590 02/04/2008
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EXAMINER
COLUCCI, MICHAEL C

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
02/04/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/522,328	BULUSU ET AL.	
	Examiner	Art Unit	
	Michael C. Colucci	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 2* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 2* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *01/25/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 11/28/2007 (Remarks page 6) have been fully considered but they are not persuasive. Applicant's response to the rejection under 103(a) argues that the applied art fails to teach providing multiple grammars to multiple languages where each grammar is unique to a particular language and part of a unified grammar specification. Examiner does not concur as Williams, teaches by using the present invention, tools that require parsers can be rapidly configurable to recognize entirely different forms of input (e.g., a different assembly language). Also, Williams teaches that the parsing table is created from the grammar of the language to be parsed. Thus, the parsing table is unique to each language and its grammar, where syntax is the structure and specification of each language according to rules established for each language. These rules are referred to as the grammar. The semantics of each language is the meaning conveyed by and associated with the syntax of that language. Therefore it is understood the invention disclosed in the prior art, particularly by Williams teaches the capability to handle multiple languages and grammars.

Additionally, Examiner does not concur as Moore alone teaches that it is well known to one skilled in the art to use a general-purpose parsing algorithm is used with a formal grammar for a specific language to parse strings in that language. That is, rather than having separate programs for parsing English and French, a single program is used to parse both languages, but it is supplied with a grammar of English to parse English text, and a grammar of French to parse French text. Therefore using combined

grammars in addition to a translation method, produce a system that can parse and translate various languages into other various languages is possible, given the grammar is present for that particular language.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-2 rejected under 35 U.S.C. 103(a) as being unpatentable over Williams US 5963742 A (Williams) in view of Moore US 7027977 B2 (Moore) and further in view of Newsted et al US 6016467 A (herein after Newsted).

Re claim 1, method of automatic translation of sentences from a source language Ls selected from language L1 to Ln to a target language Lt selected from languages L1 to Ln (col 1 lines 10-25) comprising the steps of:

(i) providing grammars G1 to Gn of all the languages L1 to Ln respectively, in which each grammar is unique to that particular language (col 1 lines 10-35), and a text 'S' in the source language Ls as inputs (col 1 lines 10-25);

(ii) creating a unified grammar specification UG for the grammars G1 to Gn (col 1 lines 36-52);

(iii) separating the input text 'S' in the source language Ls into a list of tokens using a lexical analyzer for the source language Ls (col 1 lines 24-35);

(v) obtaining a set of grammar production rules Pe from the united grammar specification UG (col 1 lines 36-52)

(vii) for each terminal symbol (col 2 lines 7 -17) obtained from the previous step, which is equivalent to a corresponding symbol in the list of tokens T of the input text in the source language Ls (col 1 lines 24-35),

(viii) if all the symbols in the said list of terminal symbols and/or non-terminal symbols (col 2 lines 7 -17) corresponding to the source language grammar Gs match with all the symbols in the list of tokens T of the input text in the source language Ls (col 1 lines 24-35),

However, Williams fails to teach languages L1 to Ln as well as grammars G1 to Gn (Moore col 1 lines 39-47) (iv) setting a current non-terminal symbol to the start symbol of the unified grammar specification UG (Moore col 1 lines 48-61);

contain the current non-terminal symbol (Moore col 1 lines 48-61);

considering the next symbol in said list of terminal symbols and/or non-terminal symbols (Moore col 1 line 39 – col 2 line 30) corresponding to the source language grammar Gs and for each non-terminal symbol E obtained from the previous step, repeating step (v) onwards (Moore col 9 lines 3-18) with Es as the current non-terminal symbol E;

obtaining a list of symbols t corresponding to the target language grammar Gt from the unified grammar production rule P (Moore col 1 line 39 – col 2 line 30) and for those symbols which do not match, repeating step (vi) onwards for a next unified grammar production rule P (Moore col 9 lines 3-18) defined for the non-terminal symbol 'E';

(x) for each terminal symbol obtained from the previous step outputting the symbol, and considering the next symbol and for each non-terminal obtained from the previous step, obtaining another unified grammar production rule P corresponding to that non-terminal symbol (Moore col 1 line 39 – col 2 line 30) and repeating the previous step with the new unified grammar production rule (Moore col 9 lines 3-18), till all the symbols in the list of symbols t corresponding to the target language grammar Gt are exhausted (Moore col 5 line 64 – col 6 line 19).

Moore teaches Parsing by computer is sometimes performed by a program that is specific to a particular language, but often a general-purpose parsing algorithm is used with a formal grammar for a specific language to parse strings in that language. That is, rather than having separate programs for parsing English and French, a single program is used to parse both languages, but it is supplied with a grammar of English to parse English text, and a grammar of French to parse French text.

Moore teaches a context-free grammar consists of terminal symbols, which are the tokens of the language; a set of non-terminal symbols, which are analyzed into sequences of terminals and other non-terminals; a set of productions, which specify the

analyses; and a distinguished "top" non-terminal symbol, which specifies the strings that can stand alone as complete expressions of the language.

Additionally, Moore teaches in this grammar, terminals are all lower case, nonterminals begin with an upper case letter, and S is the distinguished top symbol of the grammar. The productions can be read as saying that a sentence can consist of a noun phrase followed by a verb phrase, a noun phrase can consist of a name, john and mary can be names, a verb phrase can consist of a verb followed by a noun phrase, and likes can be a verb. It should be easy to see that the string john likes mary can be analyzed as a complete sentence of the language defined by this grammar according the following structure:

Moore teaches a prediction from the incomplete edges ending at the corresponding input position is selected from the chart. Next, the left-corner table is examined to see whether the mother A is a left corner of that prediction. This is indicated by blocks 174 and 176 in FIG. 3C. If not, then the production with A as its mother is inconsistent with the incomplete edges containing the selected prediction. This is repeated until a match is found or no predictions are left to be tested. At that point, if no match has been found, the top-down left-corner check is not satisfied. This is indicated by blocks 177 and 178, and the production is not added to the chart. Moore teaches the term "item", as used herein, means an instance of a grammar production with a "dot" somewhere on the right-hand side to indicate how many of the daughters have been recognized in the input, e.g., A.fwdarw.B.sub.1.B.sub.2. An "incomplete item" is an item with at least one daughter to the right of the dot, indicating that at least

one more daughter remains to be recognized before the entire production is matched; and a "complete item" is an item with no daughters to the right of the dot, indicating that the entire production has been matched.

However, Williams in view of Moore fails to teach (vi) for each unified grammar production rule P in the set of grammar production rules Pe taking each symbol one by one from a list of terminal symbols and/or non-terminal symbols corresponding to the source language grammar Gs, determining whether it is a terminal symbol or a non-terminal symbol (Newsted col 6 lines 42-55);

(ix) taking each symbol one by one, from the list of symbols t corresponding to the target grammar Gt and determining whether it is a terminal symbol or a non-terminal symbol (Newsted col 6 lines 42-55);

Newsted teaches that is known to those skilled in the art, a grammar is typically used to define valid programming language syntax. A grammar, such as a context free grammar, is generally defined by a set of "nonterminal symbols", a set of "terminal symbols", one or more "grammar rules" (or "rules"), and a "start symbol". Generally, using a grammar, a string of terminal symbols is derived from the start symbol. Beginning with the start symbol and applying grammar rules, nonterminal symbols are expanded and replaced with other nonterminal symbols and terminal symbols. The grammar rules are repetitively applied to each nonterminal symbol until all nonterminal symbols have been expanded and replaced with terminal symbols.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention multiple languages and multiple grammars where source/input text is tokenized by a lexical analyzer, governed by a set of production rules for each particular grammar, where terminal and nonterminal symbols are present and a nonterminal symbol designates a start symbol. It is well known to have terminal and nonterminal symbols, rules, multiple grammars, tokenization scheme, and repetition of a process until a match is or is not found for a particular production/rule. Having multiple grammars (unified grammar) would allow for a more comprehensive set of candidate languages to translate to and from. Using rules for each grammar to translate one of several languages into one of several target languages would allow the proper translation of that particular language, where repetition would allow for a search for the best possible match available in the system having any match found added to a database and any match not found discarded from a database (if no match is found, no additional candidate translations are available to be tested).

Additionally, it is also obvious to distinguish between terminal and nonterminal symbols when tokenizing portions of text, where a nonterminal symbol must be distinguished from all the other terminal symbols that are tokens to ensure that the top/starting portion of a stack, data set, or text sample is located. Without a start/top nonterminal symbol, a translation algorithm would not know when to push/pop data off stacks when tokenizing text. Using various production rules for particular grammars relevant to nonterminal and terminal symbols is well known and would allow for proper

translation of data and the ability for an algorithm to know when boundaries exist in text to identify distinct text portions.

Re claim 2, method as claimed in claim 1, wherein the unified grammar specification UG, for the grammars G1 to G. of languages L1 to L., is created by the steps of:

(i) for every production rule P of the grammars G1 to G., of the languages L1 to L., defining a unified production rule P1 in the unified grammar specification UG (col 1 lines 36-52) having the target non-terminal symbol of the production rule P as its target non-terminal symbol (col 2 lines 7 -17);

However, Williams fails to teach languages L1 to Ln as well as grammars G1 to Gn (Moore col 1 lines 39-47)

Moore teaches Parsing by computer is sometimes performed by a program that is specific to a particular language, but often a general-purpose parsing algorithm is used with a formal grammar for a specific language to parse strings in that language. That is, rather than having separate programs for parsing English and French, a single program is used to parse both languages, but it is supplied with a grammar of English to parse English text, and a grammar of French to parse French text.

Moore teaches a context-free grammar consists of terminal symbols, which are the tokens of the language; a set of non-terminal symbols, which are analyzed into sequences of terminals and other non-terminals; a set of productions, which specify the

analyses; and a distinguished "top" non-terminal symbol, which specifies the strings that can stand alone as complete expressions of the language.

Additionally, Moore teaches in this grammar, terminals are all lower case, nonterminals begin with an upper case letter, and S is the distinguished top symbol of the grammar. The productions can be read as saying that a sentence can consist of a noun phrase followed by a verb phrase, a noun phrase can consist of a name, john and mary can be names, a verb phrase can consist of a verb followed by a noun phrase, and likes can be a verb. It should be easy to see that the string john likes mary can be analyzed as a complete sentence of the language defined by this grammar according the following structure:

However, Williams in view of Moore fails to teach (ii) for each grammar G1 to G. creating a list of terminal symbols and/or non- terminal symbols in the said production rule P1 and adding each and every symbol in the list of terminal symbols and/or non-terminal symbols that are represented by the target non-terminal symbol in the production rule P to the said unified production rule P1 and repeating previous step for the next production rule of the grammars G1 to G (Newsted col 6 lines 42-55).

Newsted teaches that is known to those skilled in the art, a grammar is typically used to define valid programming language syntax. A grammar, such as a context free grammar, is generally defined by a set of "nonterminal symbols", a set of "terminal symbols", one or more "grammar rules" (or "rules"), and a "start symbol". Generally, using a grammar, a string of terminal symbols is derived from the start symbol.

Beginning with the start symbol and applying grammar rules, nonterminal symbols are expanded and replaced with other nonterminal symbols and terminal symbols. The grammar rules are repetitively applied to each nonterminal symbol until all nonterminal symbols have been expanded and replaced with terminal symbols.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention multiple languages and multiple grammars where source/input text is tokenized by a lexical analyzer, governed by a set of production rules for each particular grammar, where terminal and nonterminal symbols are present and a nonterminal symbol designates a start symbol. It is well known to have terminal and nonterminal symbols, rules, multiple grammars, tokenization scheme, and repetition of a process until a match is or is not found for a particular production/rule. Having multiple grammars (unified grammar) would allow for a more comprehensive set of candidate languages to translate to and from. Using rules for each grammar to translate one of several languages into one of several target languages would allow the proper translation of that particular language, where repetition would allow for a search for the best possible match available in the system having any match found added to a database and any match not found discarded from a database (if no match is found, no additional candidate translations are available to be tested).

Additionally, it is also obvious to distinguish between terminal and nonterminal symbols when tokenizing portions of text, where a nonterminal symbol must be distinguished from all the other terminal symbols that are tokens to ensure that the top/starting portion of a stack, data set, or text sample is located. Without a start/top

nonterminal symbol, a translation algorithm would not know when to push/pop data off stacks when tokenizing text. Using various production rules for particular grammars relevant to nonterminal and terminal symbols is well known and would allow for proper translation of data and the ability for an algorithm to know when boundaries exist in text to identify distinct text portions.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5487147 A, US 20040172234 A1, US 5581696 A, US 20020138819 A1, US 6233545 B1, US 6278967 B1, US 4599691 A, US 6223150 B1, US 4984178 A, US 5642519 A.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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